



## BIOLOGICAL DIVERSITY OF LONGHORNED BEETLES (COLEOPTERA, CERAMBYCIDAE)

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### ABSTRACT

*In this article, longhorned beetles (Cerambycidae), also known as longhorned or longhorned beetles, are a large and diverse family of beetles, encompassing over 35,000 described species worldwide. These amazing insects are characterized by exceptionally long antennae that often exceed the length of their body, and display an amazing variety of shapes, sizes and colors. Longhorned beetles are found on every continent except Antarctica, in a variety of habitats, from tropical forests to arid deserts.*

Woodcutter beetles (longhorned beetles), conspicuous and interesting representatives of the order Geste, are among the most winged. Their characteristic feature is long segmented whiskers, which can be longer than the body, sometimes five times. There are a large number of woodcutting beetles, there are approximately 26 thousand species, but this is not all longhorned beetles. Every year, scientists find new species that live mainly in tropical countries [1,2].

The lumberjack family can be easily distinguished from its neighboring leaf beetles (Chrysomelidae). One of the most striking distinctive features is one of the biological features of woodcutters, namely, they have the ability to “throw their antennae over their backs,” that is, they can strongly bend them back, while leaf beetles have only the opposite ability [3, 4].

Lumberjacks are important in the food chain. The larvae and pupae are eaten by various birds and parasitic insects. Birds, reptiles and small mammals eat the adults. Woodcutting beetles serve a sanitary role as they dispose of dead wood. In addition, longhorned beetles are pollinators for many flowering plants [5–7]. The purpose of the study was to study the species composition of representatives of the longhorned beetle family in the Gomel region. Studies of the species composition of longhorned beetles were carried out from June to July 2017. Visits to hospitals were carried out at different times of the day, species diversity, abundance and location of species in the biotopes were recorded. During the research period, three hospitals located in the Gomel region were studied. During our research, we captured 32 beetles. The “Mixed Forest” station was characterized by the largest number of representatives of the family Cerambycidae, which is 44% of the total number of recorded individuals (figure).



The distribution of species richness has several different character. Thus, the largest number of species was recorded at the "Mixed Forest" station - 6 species (table). The same number of species (5 each) was noted at the "Sukhodolny Meadow" and "Floodplain Meadow" stations. Thus, based on our results, it was revealed that woodcutters predominated in numbers at the Mixed Forest station, and the species diversity at all stations has almost the same number of species, and a large number of species are not repeated. This is due to the fact that a number of woodcutting beetles do not need trees throughout their entire life cycle, but only during the larval stage. A large number of adults are plant pollinators. The different species at each site are also evidenced by the diversity of trees growing in or near the area. The species structure of Cerambycidae at these sites varies to a small extent. Thus, the only common dominant species is *Aromia moschata* (31%). This is due to the fact that this species lives in plantings (including mixed ones) where willow, aspen, alder, poplar, and maple grow, and they also visit flowers (umbelliferae, rosaceae, and others) for additional nutrition. Also, in addition to the above-mentioned species, *Acanthocinus aedilis* (13%), *Prionus coriarius* (10%), *Monochamus galloprovincialis* (10%) are represented to a lesser extent.

**Table 1. Species composition of longhorned beetles in the studied areas**

| Types                                                     |            |                   |              | Total     |
|-----------------------------------------------------------|------------|-------------------|--------------|-----------|
|                                                           | Dry meadow | Floodplain meadow | Mixed forest |           |
| Family ( <i>Cerambycidae</i> )                            |            |                   |              |           |
| Subfamily True longhorned beetles ( <i>Cerambycinae</i> ) |            |                   |              |           |
| <i>Aromia moschata</i> L.                                 | 3          | 4                 | 3            | 10        |
| <i>Callidium coriaceum</i> Rk.                            | 0          | 0                 | 2            | 2         |
| <i>Cerambyx cerdo</i> L.                                  | 0          | 1                 | 0            | 1         |
| <i>Plagionotus arcuatus</i> L.                            | 0          | 1                 | 0            | 1         |
| Subfamily Prionins ( <i>Prioninae</i> )                   |            |                   |              |           |
| <i>Prionus coriarius</i> L.                               | 0          | 0                 | 3            | 3         |
| Подсемейство Ламиины ( <i>Lamiinae</i> )                  |            |                   |              |           |
| <i>Acanthocinus aedilis</i> L.                            | 0          | 0                 | 4            | 4         |
| <i>Monochamus galloprovincialis</i> L                     | 3          | 0                 | 0            | 3         |
| Subfamily Spondylidinae ( <i>Spondylidinae</i> )          |            |                   |              |           |
| <i>Tetropium castaneum</i> L.                             | 0          | 0                 | 1            | 1         |
| <i>Criocephalus rusticus</i> L.                           | 0          | 0                 | 1            | 1         |
| <i>Spondylis buprestoides</i> L.                          | 1          | 0                 | 0            | 1         |
| Subfamily Barbels ( <i>Lepturinae</i> )                   |            |                   |              |           |
| <i>Strangalia quadrifasciata</i> L.                       | 1          | 0                 | 0            | 1         |
| <i>Rhagium mordax</i> L.                                  | 1          | 0                 | 0            | 1         |
| <i>Leptura rubra</i> L.                                   | 0          | 2                 | 0            | 2         |
| <i>Stictoleptura fulva</i> L.                             | 0          | 1                 | 0            | 1         |
| <b>Bcero</b>                                              | <b>9</b>   | <b>9</b>          | <b>14</b>    | <b>32</b> |



|    |      |      |      |  |
|----|------|------|------|--|
| H' | 0,65 | 0,64 | 0,72 |  |
| C  | 0,26 | 0,27 | 0,19 |  |
| e  | 0,40 | 0,40 | 0,27 |  |

At the "Floodplain Meadow" and "Sukhodolny Meadow" stations, as a result of mathematical processing of the results, the Shannon index is 0.64–0.65. Since it does not fit into the interval, this means that the community is poorly represented by species. The Simpson index is 0.26–0.27, which means that there are not many dominants in this community, which may indirectly indicate the instability of this cerambycidocenosis.

The Piel index is 0.40, which indicates that the given biotopes are not fully formed, which is explained by a significant number of species in the catches with a small number of individuals of each species. At the mixed forest station, as a result of mathematical processing of the results, the Shannon index is 0.72. Since it does not fit into the interval, this means that the community is poorly represented by species. The Simpson index is 0.19, which means that there are many dominants in this community. The Piel index is 0.27, which indicates that this biotope is more developed in relation to other stations, which is explained by a significant number of species in the catches, with the dominance of a large number of species. In the stationary floodplain meadow, only one species of longhorned beetle dominates, *Aromia moschata* L. (44%). This is probably due to the large number of flowering plants that this species needs to replenish the nutrients the beetles need for life and the maturation of eggs in females. Also, due to the large number of flowering plants, a species such as *Leptura rubra* L. (22%) was repeatedly encountered in this area, which also feed on flowers. In the stationary dry meadow, two species *Aromia moschata* L. (33%) and *Monochamus galloprovincialis* L. (33%) are equally dominant. This may be due to the presence of pine plantations not far from it. The mixed forest is dominated by a large number of species: *Acanthocinus aedilis* L. (29%), *Prionus coriarius* L. and *Aromia moschata* L. 21% each, *Callidium coriaceum* Rk (14%). This is due to the fact that the life cycle of these species is closely related to various trees, and representatives of these species have a large food supply. It should also be noted that at this station the largest number of species were noted that were not found anywhere else in the studied areas.

The dominance of one species or another in different areas indicates that each species prefers certain conditions or food supply. The identified feature may indicate that each territory has optimal living conditions for these species. Summing up the results of the studies of the cerambycid fauna of the Gomel region, we can conclude that 14 species of representatives of the family Cerambycidae, belonging to 5 subfamilies - Cerambycinae, Prioninae, Lamiinae, Spondylidinae, Lepturinae, were identified in the communities. The richest in terms of species was the subfamily of longhorned beetles (Cerambycinae), the relative abundance of which is 44%.

It was revealed that both in terms of species richness and abundance, dragonflies predominated at the "Mixed Forest" stationary site. This can be explained by the fact that the life cycle of longhorned beetles is inextricably linked with trees, and therefore a wide variety of trees is optimal for the habitat of representatives of the family Cerambycidae. One common species for the three hospitals is *Aromia moschata* L.



This is due to the fact that this species lives in plantings (including mixed ones) where willow grows, and also visits flowers (umbellaceae, rosaceae and others) for additional nutrition. In addition to willows, aspen, alder, maple, and poplar serve as forage species. That is, due to diversity in diet, this species is distributed in three selected territories.

These hospitals are not distinguished by a wide variety of species and individuals, since during the period of research there were insufficiently favorable weather conditions. Also, for most species, the summer period occurs at the end of July and beginning of August. That is, the research period did not coincide with the active summer period of longhorned beetles.

## References:

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